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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/731,945	12/07/2000	John C. Waldrop III	99-113A	9765

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EXAMINER	
STAICOVICI, STEFAN	

ART UNIT	PAPER NUMBER
1732	

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/731,945	WALDROP ET AL.	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-8 and 10-12* is/are pending in the application.

4a) Of the above claim(s) *2* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-8 and 10-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Reopening of Prosecution After Appeal

1. In view of the Supplemental Appeal Brief filed on November 17, 2003 and further consideration, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Election/Restrictions

2. Applicant's election with traverse of Group I in Paper No. 12 is acknowledged. For the reasons set forth in the Final Rejection mailed February 26, 2003, it is submitted that the criteria of MPEP § 803 has been met and as such the restriction requirement is deemed proper and is therefore made FINAL.

Specification

3. The abstract of the disclosure is objected to because the Abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art. A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 4-8 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "modest" in claims 1 and 10 is a relative term that renders the claim indefinite. The term "modest" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. It is noted that the original disclosure does not provide a numerical example of what constitutes "modest permeability."

The term "stiff but pliable" in claims 1 and 10 is a relative term which renders the claim indefinite. The term "stiff but pliable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 4-8 are rejected as dependent claims.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US Patent No. 4,132,755) in view of White *et al.* (US Patent No. 5,427,725) and in further view of EP 0 816 438 A2, Shepherd (US Patent No. 5,129,813) and McClure *et al.* (US Patent No. 6,090,335).

Johnson ('755) teaches the basic claimed double vacuum bag process of impregnating with resin a fibrous reinforcement including, providing a mold (1), positioning a fibrous reinforcement preform (2) onto said mold (assembling a perform from suitable reinforcement in a mold), double bagging said reinforcement preform with an inner bag (4) and an outer bag (3), vacuum debulking said assembled preform and infusing resin into said debulked reinforcement perform using a vacuum-assisted resin transfer molding process (see col. 4, line 49 through col. 6, line 50).

Regarding claim 1, although Johnson ('755) teaches an adhesive (col. 8, lines 4-14), Johnson ('755) does not specifically teach tackifying the fiber reinforcement. White *et al.* (725) teach molding a fiber composite including, a first step of partially curing a tackified fiber reinforced composite and a second step of molding said tackified composite by impregnating

said fiber reinforced matt with a resin and co-curing the tackifier and the resin to form the composite (see Abstract). It would have been obvious for one of ordinary skill in the art to have first tackified the fiber reinforced preform as taught by White *et al.* ('725) in the double vacuum bag process of Johnson ('755) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity.

Further regarding claim 1, Johnson ('755) in view of White *et al.* ('725) do not teach a tackifier containing toughening agents for improved damage tolerances. EP 0 816 438 A2 teaches a fiber reinforced prepreg with superior tack containing particulate elastomers (toughening agent) that improve damage tolerances (see Abstract and col. 2, lines 44-58). Therefore, it would have been obvious for one of ordinary skill in the art to have provided toughening agents as taught by EP 0 816 438 A2 to the tackifier in the double vacuum bag process of Johnson ('755) in view of White *et al.* ('725) because, EP 0 816 438 A2 specifically teaches that such toughening agents provide for improved damage tolerances, hence improving product quality and also because all references teach similar materials and end-products.

Further regarding claim 1, although Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 teach a double vacuum bag system, Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 do not specifically teach a low modulus, high elongation nylon vacuum bag that minimizes wrinkling during the molding process. Shepherd ('813) teach a low modulus, high elongation nylon vacuum bag that allows evacuation of air without formation of air pockets and wrinkles (see col. 2, lines 23-27; col. 4, lines 60-65 and, Table 1). Therefore, it would have been obvious for one of ordinary skill in the

art to have provided a low modulus, high elongation nylon vacuum bag that minimizes wrinkling as taught by Shepherd ('813) in the process of Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 because, Shepherd ('813) specifically teach that such a bag allows for evacuation of air without formation of air pockets and wrinkles, hence providing for an improved molding process and an improved molded product. It is submitted that wrinkles are being minimized during the molding process.

Further regarding claim 1, Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 and Shepherd ('813) do not teach a resin flow distribution medium between the inner bag and the fibrous reinforcement. McClure *et al.* ('335) teach a vacuum resin infusion process including, providing a resin flow control medium that forms a screen of open space that tends to wick the resin (fill fibers that act as weirs to the infusing resin) (see col. 1, lines 50-55). Further, McClure *et al.* ('335) teach removing said resin flow control medium prior to full curing, hence it is submitted that it is stiff, but pliable and chemically inert. Therefore, it would have been obvious for one of ordinary skill in the art to have provided a resin flow control medium as taught by McClure *et al.* ('335) in the process of Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 and Shepherd ('813) because, McClure *et al.* ('335) specifically teach that a resin flow control medium creates a uniform and homogeneous resin flow, hence improving product quality. It is submitted that because the resin flow is uniform and homogeneous that markoff on the side of the vacuum bag in the process of Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 and Shepherd ('813) is eliminated. Further, it should be noted that the exposure temperature of the resin flow control medium is dependent on the type of resin being infused. It is submitted that the resin flow control

medium in the process of Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) can withstand a temperature of up to about 600 °F because the resin used requires such curing temperatures.

In regard to claim 6, White *et al.* (725) teach a two-step molding process. Specifically, White *et al.* (725) teach that in the first step, the fiber reinforced matt is tackified at an elevated temperature of about 40 to 100 degrees C. In the second step, the heated tackified fiber reinforced matt is impregnated with resin in a mold to form a composite. Therefore, it would have been obvious for one of ordinary skill in the art to have first heated the fiber reinforced matt as taught by White *et al.* ('725) and then impregnated the heated tackified fiber reinforced matt under vacuum in the process of Johnson ('755) in view of EP 0 816 438 A2 and in further view of Shepherd ('813) and McClure *et al.* ('335) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity.

Specifically regarding claim 7, White *et al.* (725) teach a first step of partially curing a tackified fiber reinforced composite at a temperature of about 40 to 100 degrees C. In the second step, the heated tackified fiber reinforced matt is impregnated with resin in a mold to form a composite. Further, Johnson ('755) teach infusing resin into a debulked reinforcement perform using a vacuum-assisted resin transfer molding process. Therefore, it would have been obvious for one of ordinary skill in the art to have first heated the fiber reinforced matt as taught by White *et al.* ('725) and then debulked and impregnated the heated tackified fiber reinforced matt under vacuum in the process of Johnson ('755) because, White *et al.* ('725) specifically teach that

tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity.

Regarding claim 8, White *et al.* (725) teach that glass and carbon fibers are equivalent alternatives (see col. 2, lines 50-53). Further, White *et al.* (725) teach an epoxy resin and an epoxy resin tackifier (col. 4, lines 55-56). It would have been obvious for one of ordinary skill in the art to have used a carbon fiber, an epoxy resin and an epoxy tackifier to tackify the carbon fiber reinforced preform as taught by White *et al.* ('725) in the process of Johnson ('755) in view of EP 0 816 438 A2 and in further view of Shepherd ('813) and McClure *et al.* ('335) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity and also because, White *et al.* ('725) teach that carbon fibers and glass fibers are equivalent alternatives and, all references teach similar materials and end-products.

8. Claims 4-5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US Patent No. 4,132,755) in view of White *et al.* (US Patent No. 5,427,725) and in further view of EP 0 816 438 A2, Shepherd (US Patent No. 5,129,813), McClure *et al.* (US Patent No. 6,090,335) and Imanara *et al.* (US Patent No. 5,364,584).

Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) teach the basic claimed process as described above.

Regarding claims 4-5, Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) do not teach an infusion direction

that is tilted at an angle from the horizontal. Imanara *et al.* ('584) teach a molding process of a fiber reinforced matt including tilting the mold at an angle (see Figure 1). It would have been obvious for one of ordinary skill in the art to have tilted that mold assembly as taught by Imanara *et al.* ('584) in the process of Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) because, Imanara *et al.* ('584) specifically teach that tilting reduces the amount of voids in the final molded article, hence improving resin impregnation and product quality (see col. 4, lines 55-65).

Further in regard to claim 5, and regarding claim 10, Imanara *et al.* ('584) teach that injection of resin occurs at a lower portion such that resin flows upwardly, hence against gravitation. Therefore, it would have been obvious for one of ordinary skill in the art to have injected resin at a lower portion of a mold such that resin flows against gravitation as taught by Imanara *et al.* ('584) in the process of Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) because, Imanara *et al.* ('584) specifically teach that tilting and injecting resin against gravitation reduces the amount of voids in the final molded article, hence improving resin impregnation and product quality (see col. 4, lines 55-65).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US Patent No. 4,132,755) in view of White *et al.* (US Patent No. 5,427,725) and in further view of EP 0 816 438 A2, Shepherd (US Patent No. 5,129,813), McClure *et al.* (US Patent No. 6,090,335) and Stoeberl (US Patent No. 4,120,632).

Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) teach the basic claimed process as described above.

Regarding claim 11, Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) do not teach throttling the vacuum lines. Stoeberl ('132) teaches a vacuum molding process in which a resin is infused into a preform position in a mold cavity (see Figures 3c and 2b). Further, Stoeberl ('132) teaches the idea of throttling vacuum line (13) in order to provide uniform distribution of resin (9) throughout the fiber reinforcement (1) (see col. 4, lines 35-50). It is submitted that the uniform distribution of resin in Stoeberl ('132) by throttling the vacuum line results in equal mass flow rate of resin throughout the preform and the vacuum line. Therefore, it would have been obvious for one of ordinary skill in the art to have throttled vacuum lines as taught by Stoeberl ('132) in the process of Johnson ('755) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) because, Stoeberl ('132) specifically teaches that throttling of a vacuum line provides uniform resin distribution throughout the fiber reinforcement and reduces porosity by allowing air to escape, hence improving product quality.

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (US Patent No. 4,132,755) in view of Stoeberl (US Patent No. 4,120,632).

Johnson ('755) teaches the basic claimed double vacuum bag process of impregnating with resin a fibrous reinforcement including, providing a mold (1), positioning a fibrous reinforcement preform (2) onto said mold (assembling a perform from suitable reinforcement in a mold), double bagging said reinforcement preform with an inner bag (4) and an outer bag (3), vacuum debulking said assembled preform and infusing resin into said debulked reinforcement perform using a vacuum-assisted resin transfer molding process (see col. 4, line 49 through col. 6, line 50).

Regarding claim 12, Johnson ('755) does not teach throttling the vacuum lines. Stoeberl ('132) teaches a vacuum molding process in which a resin is infused into a preform position in a mold cavity (see Figures 3c and 2b). Further, Stoeberl ('132) teaches the idea of throttling vacuum line (13) in order to provide uniform distribution of resin (9) throughout the fiber reinforcement (1) (see col. 4, lines 35-50). It is submitted that the uniform distribution of resin in Stoeberl ('132) by throttling the vacuum line results in equal mass flow rate of resin throughout the preform and the vacuum line. Therefore, it would have been obvious for one of ordinary skill in the art to have throttled vacuum lines as taught by Stoeberl ('132) in the process of Johnson ('755) because, Stoeberl ('132) specifically teaches that throttling of a vacuum line provides uniform resin distribution throughout the fiber reinforcement and reduces porosity by allowing air to escape, hence improving product quality.

Response to Arguments

11. Applicants' remarks filed in the Supplemental Appeal Brief filed on November 17, 2003 have been considered, but are moot in view of the new ground(s) of rejection.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached at (571) 272-1196.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1300.

Stefan Staicovici, PhD

Primary Examiner 1/25/04

AU 1732

January 25, 2004